



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/974,007	10/10/2001	Chad A. Mirkin	00-713-i8	8209
7590	02/10/2006		EXAMINER	
Emily Miao McDonnell Boehnen Hulbert & Berghoff 32nd Floor 300 S. Wacker Drive Chicago, IL 60606			RILEY, JEZIA	
			ART UNIT	PAPER NUMBER
			1637	
DATE MAILED: 02/10/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<p><b>Application No.</b></p> <p>09/974,007</p>	<p><b>Applicant(s)</b></p> <p>MIRKIN ET AL.</p>	
	<p><b>Examiner</b></p> <p>Jezia Riley</p>	<p><b>Art Unit</b></p> <p>1637</p>	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 433-437,441-443,445 and 446 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 433-437,441-443,445 and 446 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/14/2005 has been entered.

### ***Response to Remarks***

2. Applicants' arguments, filed on 7/14/05, have been approved and entered. They have been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either newly applied or reiterated. They constitute the complete set presently being applied to the instant application.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

Art Unit: 1637

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 433-437, 441-443, 445, 446 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yguerabide et al. (6,214,560).

Yguerabide et al. discloses a method of light illumination and detection named "DLASLPD" (direct light angled for scattered light only from particle detected), which is an analyte assay using gold particulate label for specific detection of one or more

Art Unit: 1637

analytes in a sample. One or more analytes in a sample can be detected and measured by detection and/or measurement of one or more of the specific light scattering properties of metal-like particles. (Summary of the Invention). For example, a certain nucleic acid analyte is composed of about 100 nucleic acid bases and is present in a sample. The sample is prepared so that this nucleic acid is in a single stranded form. Then two or more unique single-stranded "probe" nucleic acid sequences are added to the sample where these different probes bind to different regions of the target strand. Each of these probes has attached to one or more particles (col. 74). Further, the particles can form different types of aggregates that can be detected visually or instrumentally in a microscope or through macroscopic observation or measurements without having to separate free from analyte bound particles. Low particle surface density (less than 0.1 particles per  $\mu^2$ ) on a spot and high particle surface density (greater than 0.1 particles per  $\mu^2$ ) on a spot are also disclosed which are viewed to be inclusive of the instant claims.

In certain analytical and diagnostic assays, it may be preferable to increase the detectability of the scattered light properties of the particles so that very simplified or no detection instrumentation is required. By use of the appropriate molecular recognition binding-pairs and particles it is possible to significantly increase the level of detection sensitivity. Single-stranded homopolymer sequences, avidin-biotin, streptavidin-biotin, and other binding-pair systems can be used to "chain-together" and "build-up" many particles (col. 73-76).

The reference describes methods of attachment of substances to particles and other surfaces. In this method of attaching substances to particles or other surfaces, a two step approach which involves the use of base material molecules is used. Suitable base material molecules are any substance which can approach and interact with the surface by adsorption or other chemical process, and have accessible functional groups to which additional substances, as for example, binding agents can be attached. As an example, the reference has used a derivative of a polyethylene glycol. The properties of this molecule allow for its use as a base material molecule. Each molecule of this polymer has four amine groups, which can serve as linkage sites for the conjugation of additional substances. The hydrophobic backbone of the polyethylene derivative interacts with the particle and is attached to the particle surface by adsorption or some other process. This interaction is very strong. The amine groups do not appear to interact with the particle surface and are accessible as conjugation sites for the attachment of additional substance, such as, binding agents. Using this polymer as the base molecule they have prepared two different types of particle-binding agent reagents. One reagent contains biotin groups as binding agents and the other particle-binding agent reagent was made to contain single-stranded nucleic acids as binding agents. The biotin used for attachment was a chemically modified form where it will covalently link to amine groups. For the nucleic acids, the 5' ends were chemically modified so that they would chemically react with the amine groups. Linker arms of various lengths and composition can also be incorporated into the molecular structure.

Art Unit: 1637

For example, a small molecular weight base material molecule can be used where its molecular structure is optimized for attachment to the particle or surface, attachment of most any substance to it with any desired orientation, and with a high level of binding activity. As an example, a linear polypeptide twenty amino acids in length is chemically modified at one terminus by the addition of disulfide or thiol chemical groups. The native polypeptide is composed of amino acids such that the polypeptide chain will not interact with the surface except through the chemically modified end. At the other terminus a free amino group exists, or alternatively, has been chemically modified for a desired conjugation process such that most any substance can be attached at this position. This low molecular weight base material molecule then is used in one or more variations of the methods as described herein. (col. 77-81). The polyethylene glycol or the polypeptide is viewed to be inclusive of the spacer portion of instant claim 243 for example. And the amine group is viewed to be inclusive of the functional group.

6. Response to arguments:

Applicants argue that Yguerabide et al does not teach or suggest the instant application. However this is not convincing.

Yguerabide et al. discloses an analyte assay using gold particulate label for specific detection of one or more analytes in a sample. A sample is prepared so that this nucleic acid is in a single stranded form. Then two or more unique single-stranded "probe" nucleic acid sequences are added to the sample where these different probes bind to different regions of the target strand. Each of these probes has attached to one

Art Unit: 1637

or more particles. Small molecule can be used where it's molecular structure is optimized for attachment to the particle or surface, attachment of most any substance to it with any desired orientation, and with a high level of binding activity (which is viewed as the functional groups. With respect to the recitation of "recognition oligonucleotide", "spacer portion" and "diluent oligonucleotide" are only limiting to their specific definitions given in the specification (see page 22, lines 2-6). These definitions are very broad and encompass any nucleotide sequence. Accordingly, the claims have been interpreted as being drawn to a nanoparticle comprising any oligonucleotides, wherein the oligonucleotides are either directly or indirectly attached to nanoparticles.

The recitation of surface density will be obvious, since stability would likely depend on external conditions (e.g., temperature, aqueous conditions, etc.), and presumably, as long as the oligonucleotide is attached either directly or indirectly, the oligonucleotides would be present at a surface density sufficient so that the nanoparticles are stable and therefore include at least 10picomole/cm<sup>2</sup>.

### ***Drawings***

7. The drawings are objected to because they contain non formal drawings.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be



Art Unit: 1637

canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). The objection to the drawings will not be held in abeyance.

8. No claim is allowed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jezia Riley whose telephone number is 571-272-0786. The examiner can normally be reached on 9:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1637

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Monday, February 06, 2006

A handwritten signature in black ink, appearing to read 'Jezia Riley', is positioned above the printed name and title.

Jezia Riley  
Primary Examiner